

AMENDMENTS

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously presented): A negative photoresist composition with multi-reaction systems, comprising the following components as a uniform solution in an organic solvent:

at least one unsaturated resin having a molecular weight in the range from 5,000 to 250,000 and an acid value between 50 and 250mgKOH/g, selected from the group consisting of homopolymers, copolymers, and combinations thereof, which the homopolymers and the copolymers are synthesized by at least one monomer selected from the group consisting of styrene, methyl styrene, acrylic acid, acrylate, methyl lacrylic acid, methyl acrylate, vinyl ether, and combinations thereof;

at least one photoinitiator in an amount of 0.1 to 35 parts by weight, based on 100 parts by weight of the unsaturated resin;

at least one free radical reactive monomer in an amount of 0.1 to 100 parts by weight;

at least one photoacid generator in an amount of 0.1 to 35 parts by weight, wherein the photoacid generator is triaryl sulfonium hexafluorophosphate, triphenyl triflate, triphenyl stibnite, methoxy triphenyl triflate, methoxy triphenyl stibnite, trimethyl triphenyl triflate or combinations thereof; and

at least one cation reactive monomer in an amount of 0.1 to 35 parts by weight.

2. (Original): The negative photoresist composition as claimed in claim 1, wherein the multi-reaction systems comprise free-radical polymerizations and cation polymerizations.

3-5. (Canceled).

6. (Previously presented): The negative photoresist composition as claimed in claim 1, wherein the unsaturated resin has a molecular weight in the range from 10,000 to 100,000 and an acid value between 70 and 150mgKOH/g.

7. (Previously presented): The negative photoresist composition as claimed in claim 1, wherein the at least one photoinitiator is present in an amount of 0.1-10 parts by weight, based on 100 parts by weight of the unsaturated resin.

8. (Original): The negative photoresist composition as claimed in claim 1, wherein the photoinitiator is selected from the group consisting of benzoin, benzoin alkyl ether, benzil ketals, acetophenones derivatives, benzophenone, 4,4'-dimethyl-amino-benzophenone, thioxanthenes derivatives, morpholino-1-propanone, and combinations thereof.

9. (Previously presented): The negative photoresist composition as claimed in claim 1, wherein the at least one free radical reactive monomer is present in an amount of 5-25 parts by weight, based on 100 parts by weight of the-unsaturated resin.

10. (Original): The negative photoresist composition as claimed in claim 1, wherein the free radical reactive monomer is selected from the group consisting of tetraethylene glycol diacrylate, tetraethylene glycol dimethacrylate, neopentylglycol diacrylate, neopentylglycol dimethyl acrylate, polyethylene glycol diacrylate, polyethylene glycol dimethylacrylate, ethoxylated bisphenol A glycol diacrylate, ethoxylated bisphenol A glycol dimethyl acrylate, trimethylolpropane trimethacrylate, trimethylolpropane triacrylate, pentaerythritol triacrylate, ethoxylated trimethylolpropane triacrylate, glyceryl propoxy triacrylate, pentaerythritol tetraacrylate, dipentaerythritol pentaacrylate, glycidyl acrylate, glycidylmethyl acrylate, p-epoxy-styrene, p-glycidylstyrene, allyl glycidyl ether, 3-glycidyloxy-propyl trimethoxy silane, β -(3,4-epoxycyclohexyl)-ethyl trimethoxysilane, γ -glycidoxypropyl trimethoxysilane, and combinations thereof.

11. (Previously presented): The negative photoresist composition as claimed in claim 1, wherein the at least one photoacid generator is present in an amount of 0.1-10 parts by weight, based on 100 parts by weight of the unsaturated resin.

12-13. (Canceled).

14. (Previously presented): The negative photoresist composition as claimed in claim 1, wherein the at least one cation reactive monomer is present in an amount of 5-25 parts by weight, based on 100 parts by weight of the unsaturated resin.

15. (Original): The negative photoresist composition as claimed in claim 1, wherein the cation reactive monomer is selected from the group consisting of vinyl ether monomer, epoxy monomer, and derivatives thereof.

16. (Original): The negative photoresist composition as claimed in claim 1, wherein the cation reactive monomer is selected from the group consisting of cycloaliphatic diepoxide, N,N-diglycidyl-4-glycidyoxyaniline, 3,4-epoxycyclohexylmethyl carboxylate, 3,4-epoxycyclohexane carboxylate, 1,2-cyclohexane diglycidyl dicarboxylate, 1,4-cyclohexane dimethanol diglycidyl ether, ethylene glycol divinyl ether, diethylene glycol divenyl ether, triethylene glycol divinyl ether, 1,4-cyclohexane dimethanol divinyl ether, lactones and combinations thereof.

17. (Previously presented): The negative photoresist composition as claimed in claim 1, further comprising:

at least one epoxy resin in an amount of 0.1 to 50 parts by weight, based on 100 parts by weight of the unsaturated resin; and

at least one resin hardener in an amount of 0.1 to 30 parts by weight.

18. (Original): The negative photoresist composition as claimed in claim 17, wherein the epoxy resin is selected from the group consisting of bisphenol A epoxy resin, brominated epoxy resin, phenolic novolac epoxy resin, cresol novolac epoxy

resin, naphthalene epoxy, dicyclopentadiene novolac epoxy, cycloaliphatic epoxy, isocyanate epoxy and combinations thereof.

19. (Original): The negative photoresist composition as claimed in claim 17, wherein the resin hardener is selected from the group consisting of aliphatic amine, aromatic amine, polyamide, dicyandiamide, imidazoles, anhydride and combinations thereof.

20 – 21. (Canceled)

22. (New): A negative photoresist composition with multi-reaction systems, comprising the following components as a uniform solution in an organic solvent:

at least one unsaturated resin having a molecular weight in the range from 10,000 to 100,000 and an acid value between 70 and 150mgKOH/g, selected from the group consisting of homopolymers, copolymers, and combinations thereof, which the homopolymers and the copolymers are synthesized by at least one monomer selected from the group consisting of styrene, methyl styrene, acrylic acid, acrylate, methyl lacrylic acid, methyl acrylate, vinyl ether, and combinations thereof;

at least one photoinitiator in an amount of 0.1 to 10 parts by weight, based on 100 parts by weight of the unsaturated resin, wherein the photoinitiator is selected from the group consisting of benzoin, benzoin alkyl ether, benzil ketals, acetophenones derivatives, benzophenone, 4,4'-dimethyl-amino-benzophenone, thioxanthenes derivatives, morpholino-1-propanone, and combinations thereof;

at least one free radical reactive monomer in an amount of 0.1 to 100 parts by weight, wherein the free radical reactive monomer is selected from the group consisting of tetraethylene glycol diacrylate, tetraethylene glycol dimethacrylate, neopentylglycol diacrylate, neopentylglycol dimethyl acrylate, polyethylene glycol diacrylate, polyethylene glycol dimethylacrylate, ethoxylated bisphenol A glycol diacrylate, ethoxylated bisphenol A glycol dimethyl acrylate, trimethylolpropane trimethacrylate, trimethylolpropane triacrylate, pentaerythritol triacrylate, ethoxylated trimethylolpropane triacrylate, glyceryl propoxy triacrylate, pentaerythritol tetraacrylate, dipentaerythritol pentaacrylate, glycidyl acrylate, glycidylmethyl acrylate, p-epoxy-styrene, p-glycidylstyrene, allyl glycidyl ether, 3-glycidyloxy-propyl l-trimethoxy silane, β -(3,4-epoxycyclohexyl)-ethyl trimethoxysilane, γ -glycidoxypentyl trimethoxysilane, and combinations thereof;

at least one photoacid generator in an amount of 0.1 to 35 parts by weight, wherein the photoacid generator is triaryl sulfonium hexafluorophosphate, triphenyl triflate, triphenyl stibnite, methoxy triphenyl triflate, methoxy triphenyl stibnite, trimethyl triphenyl triflate or combinations thereof;

at least one cation reactive monomer in an amount of 0.1 to 35 parts by weight, wherein the cation reactive monomer is selected from the group consisting of cycloaliphatic diepoxide, N,N-diglycidyl-4-glycidyloxyaniline, 3,4-epoxycyclohexylmethyl carboxylate, 3,4-epoxycyclohexane carboxylate, 1,2-cyclohexane diglycidyl dicarboxylate, 1,4-cyclohexane dimethanol diglycidyl ether, ethylene glycol divinyl ether, diethylene glycol divinyl ether, triethylene glycol divinyl ether, 1,4-cyclohexane dimethanol divinyl ether, lactones and combinations thereof;

at least one epoxy resin in an amount of 0.1 to 50 parts by weight, based on 100 parts by weight of the unsaturated resin, wherein the epoxy resin is selected from the group consisting of bisphenol A epoxy resin, brominated epoxy resin, phenolic novolac epoxy resin, cresol novolac epoxy resin, naphthalene epoxy, dicyclopentadiene novolac epoxy, cycloaliphatic epoxy, isocyanate epoxy and combinations thereof; and

at least one resin hardener in an amount of 0.1 to 30 parts by weight, wherein the resin hardener is selected from the group consisting of aliphatic amine, aromatic amine, polyamide, dicyandiamide, imidazoles, anhydride and combinations thereof.